2W-1054

TECHNICAL PROPOSAL

FOR

25X1A [redacted] MODEL ABD/4

FILM DRIER

18 December 1962

25X1A [redacted]

PROPRIETARY INFORMATION

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FOREWORD

25X1A [redacted] submits this proposal for a film drier which incorporates its revolutionary "air bearing plenum" as a further refinement of its current line of driers.

This proposal contains the details of the new principle which substitutes air bearings for film idling rollers and a rotating vacuum capstan for film drive rollers. This virtually friction free system extends impingement drying to its ultimate efficiency and makes the air serve the dual purposes of film drying and film transport.

25X1A

[redacted] FILM DRIER

MODEL ABD/4

GENERAL

The Model ABD/4 Film Drier incorporates a revolutionary new development, the [redacted] "air bearing" film drying plenums. This new principle will substitute air bearings and vacuum capstans for conventional rollers and transport mechanisms. Numerous advantages will accrue from this virtually friction-free system, such as elimination of emulsion contact with any solid surface, and freedom for the film to float through the drying section without strain or tension.

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The drier (see Figure 2) will be an upright modular cabinet mounted at the exit end of the processor wet section. It will be capable of drying film of all widths from [redacted] at speeds up to 15 feet per minute (Eastman Kodak Film Type SO-1188, or equivalent). Film with positive emulsion and waterproof paper may be dried at faster rates.

25X1D

The drier will measure approximately 35-1/2 by 38 (base size) by 76-1/2 inches. It will consist of six major sections: a drying compartment, a blower compartment, a heater compartment, "dancing" roller sections, a vacuum supply system, and a film takeup station.

FILM DRIVE

No sprockets, pressure rollers or other conventional transport systems will be used to drive the film through the [redacted] Model ABD/4 Drier. Instead, two vacuum capstans will contact the film on the base side only. The vacuum capstan drive will impart precise positive transport of the film while avoiding any physical contact with the emulsion.

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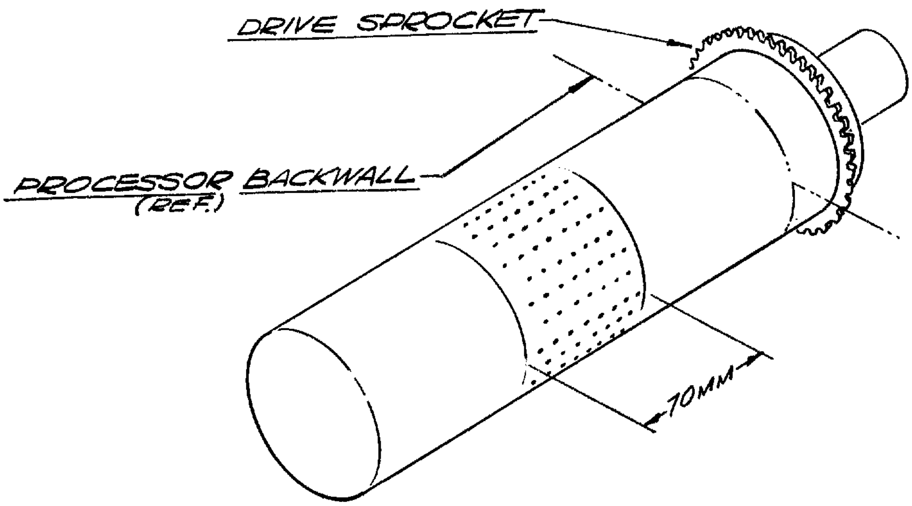
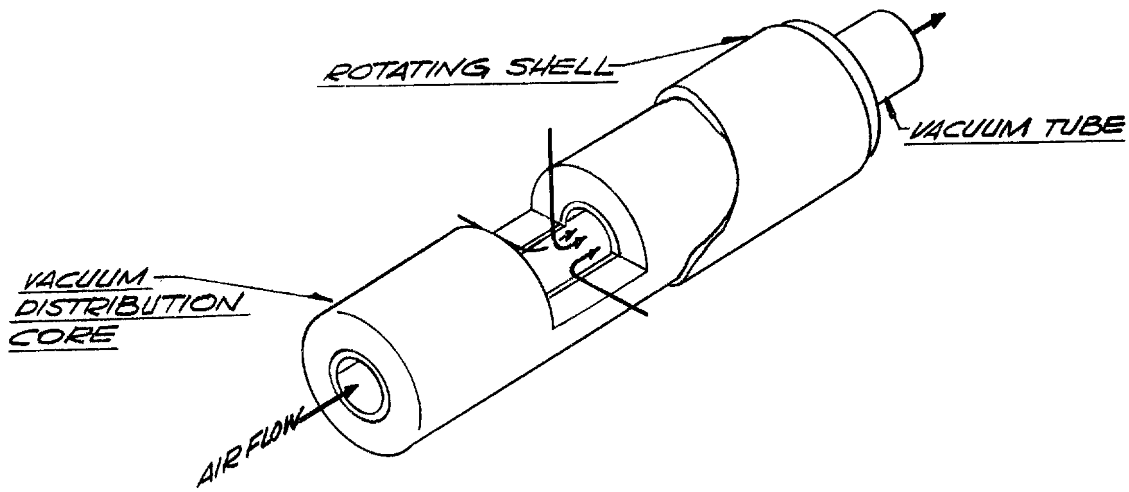
The vacuum capstan will be a precision, slotted, polished drum, that will hold the base side of the film in contact by means of a vacuum. As shown in Figure 1, an internal vacuum distribution core will confine the vacuum area to approximately 160 degrees of the capstan, including a 10 percent overhang on each side to insure that there will be minimum leakage at the points of base tangency to the drum.





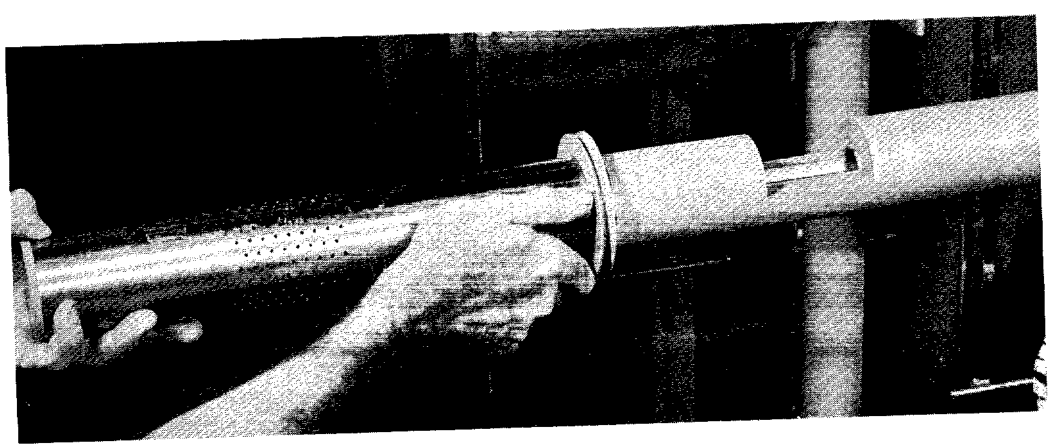


Figure 1 Vacuum Capstan Drive (Typical)

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Rotating about the vacuum distribution core will be an outer shell having slots spaced entirely around its circumference along a 2.625 inch longitudinal dimension. Vacuum, applied through the slots, will be sufficient to drive film of any width [redacted]

25X1D

Because of the low friction of the proposed system, come-along drive in the drier will be through two torque driven capstans, located at the drier entrance and exit, and matched to the processor output metering rate. Finished film will be spooled on takeup reels driven by a torque motor through a tension-control system.

DRYING COMPARTMENT

The drying compartment will consist of a cabinet which will be accessible through a full length plexiglas door. The film, upon entering this cabinet, will be threaded around 11 air-bearing plenum cylinders, as shown in Figure 2. Adjustable flanges and seals will slide along each bearing to accommodate film of various widths. The flanges will guide the tracking of the film through the drier. The film will make no mechanical contact as it passes over the cylindrical plenums, as it will ride on a cushion of air. The front end of each plenum will be closed and the rear end will mount in a fixed position on the back wall of the cabinet. Filtered air, electrically heated and thermostatically controlled at 120 to 130 degrees F., will be forced into each plenum through a manifold system. The air will impinge on the film evenly so as not to induce areas of uneven drying, which might result in reticulation, pock marks, and density variations. This system thus extends impingement drying to its ultimate efficiency and makes the air serve the dual purposes of film drying and film transport.

After ejection from the plenums and impingement on the film, the moisture laden air will be exhausted from the cabinet to the suction side of the blower. Here it will be mixed with makeup air (which can be adjusted according to requirements), reheated, and pumped back into the high pressure side of the plenums. An opening in the top of the cabinet will provide exhaust for the surplus air. Each blower will be directly coupled to its respective drive motor. Belts will not be used for either blower or transport system; therefore, the problem of dust particles from belts will be eliminated.

The system will be arranged so that a dehydrator (not included in this proposal) may be used if a cold air drying system is desired.

AIR AND VACUUM SUPPLIES

A compartment behind the drying cabinet will contain a squirrel cage blower, direct-driven by a motor. Makeup air for the blower will enter through an inlet in the back of the drier. Recirculation will be controlled by a valve which varies the exhaust-to-fresh-air ratio.

A vacuum pump will supply negative pressure for the two vacuum capstans.

DRIER HEATER

Electric heating elements will be mounted in the manifold system which will supply heated air to the pressure side of the drying plenums. The air supply will be filtered by easily replaceable filters which will hold contaminant size to 3 microns.

FILM TAKEUP STATION

As dry film emerges from the drying section, it will form a loop around a "dancing" plenum which will control film tension and bearing loop radii while continuously drying film. After passing through the drier and around the dancing plenum, the finished film will be spooled on the takeup spools. Each spool will be driven by a torque motor through a tension control system.

When one spool is filled with dry film, the operator will cut the film and attach it to the second takeup spool. The drive-selector control will then be flipped to its opposite position, so that the application of the drive will be changed from the full spool to the empty one.

A device will be provided to dissipate electrostatic charges from the film before it is wound on the spool.

CONTROLS

Controls for the complete drier assembly will be easily accessible at the takeup station, as shown in Figure 2. Located at the front of the table will be a switch for the vacuum capstan drive, a separate knob to control its speed, a switch for the takeup drive, a selector knob to apply drive to one spool or the other, a heater blower switch, a vacuum pump switch, and a thermostat to control drying air temperature.